STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
April 29, 1991	G2-28125		

NAME
Stroh Water Company

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
3408 Hunt Street	Gig Harbor	Washington	98335-2038

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well 8

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	140	113 (Partially Supplemental)

QUANTITY, TYPE OF USE, PERIOD OF USE

61 Acre-feet per year(Primary 52 Acre-feet per year (Supplemental)	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
50 feet North and 1200 feet West of the East quarter corner of Section 13.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	13	21	1E	15	Pierce

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Stroh Water as described in a Department of Health Approved Water System Plan.

DESCRIPTION OF PROPOSED WORKS

Well 8, drilled to a depth of 295 feet below ground level.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	June 1, 2000	June 1, 2010
	6/1/2003	

REPORT

BACKGROUND:

On April 29, 1991, Frederick Stroh, on behalf of the Stroh Water Company, applied for a permit to appropriate public ground water from a well at a rate of 200 gallons per minute (gpm). The water will be used for multiple domestic supply within their public water service area on the Gig Harbor Peninsula. The project site is located within the Kitsap Water Resource Inventory Area (WRIA 15). The application number is G2-28125.

A legal notice of the proposed appropriation was published. There were no protests to the appropriation.

Based on my investigation, I recommend the issuance of a water right permit.

INVESTIGATION:

The project site is located in Water Resource Inventory Area 15, which includes portions of Kitsap, Mason, King and Pierce Counties. The Stroh Water Company supply wells and service area are located on the Gig Harbor Peninsula, west of the City of Gig Harbor.

The intent of this application is to secure a water right permit for Well 8. Well 8 was constructed in December of 1995 and is located off of Wollechet Drive in a wooded area, proposed for future large-lot home tracts. Well 8 will be inter-tied with the present Stroh Water distribution system.

The well site is situated at an elevation of roughly 255 feet above sea level, near the top of a hill. Well 8 was drilled to a total depth of 295 feet below ground surface (bgs) or 40 feet below sea level (bsl), and is screened in a layer of sand and gravel between 275 and 290 feet bgs, or 20 and 35 feet bsl. A 24-hour pumping test was conducted at rates of 140 and 122 gallons per minute (gpm). The well will be equipped to pump at 140 gpm.

The nearest surface water body is an unnamed creek, known locally as Wollechet Creek. The creek originates approximately two miles inland on the Gig Harbor Peninsula and flows south into Wollechet Bay, half a mile south of the well site. The creek flows through a wooded ravine about 1,000 feet east of the well site. Elevation of the creek bed in this area is approximately 100 feet above sea level.

Regional Hydrogeology

The geology and hydrogeology of the Gig Harbor Peninsula has been described in a number of publications, including: Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands, USGS Water Supply Bulletin No. 18 (Garland and Molenaar, 1965); Water Resources of the Gig Harbor Peninsula and Adjacent Areas, Washington, USGS Open File Report 81-1021 (Drost, 1982); and the Gig Harbor Peninsula Ground Water Management Plan Task 5 Hydrogeologic Evaluation Report, prepared for the Tacoma-Pierce County Health Department (Sweet-Edwards/EMCON, Inc., 1992).

The peninsula is comprised of a thick sequence of unconsolidated and partially consolidated glacial sediments. It is nearly surrounded by Puget Sound, itself carved by glacial scouring. Only the materials extending to 200 feet below ground surface are well known because most existing wells tap these materials. The thickness of the glacial deposits is estimated to be at least 2,000 feet deep. Consolidated rock formations such as basalt have not been encountered in any wells drilled in this vicinity, the deepest of which penetrates over 1000 feet below ground surface.

Alternating glacial and interglacial periods of deposition created numerous aquifers and less permeable aquitards within the Puget Sound Lowland. Several of these aquifers and aquitards, or "hydrostratigraphic layers," have been identified within the Gig Harbor area. A total of 12 hydrostratigraphic layers are described in the Gig Harbor Peninsula Ground Water Management Plan. Primary aquifers from upper to lower include (aquitards, also shown, are shaded);

Hydro-static Layer	Aquifer Name	Geologic Unit *[Alternate or Former Name/ Correlation]*	Lithology	Max Thick-ness (ft) In Area	Elevation (ft) Above or Below Sea Level (asl/bsl)	Primary Use / Comments
Qal	N/A	Recent Alluvium	sand & gravel	N/A	N/A	Limited to valleys; no wells known
A_r	Perched Zone	Vashon Drift (recessional outwash-includes Steilacoom Gravel)	well-sorted coarse sand; mixed sand & gravel	50	N/A	Few shallow domestic dug wells; moderate/ Low T
A_t		Vashon Drift (till)	dense, poorly sorted gravel, sand, silt & clay	75	N/A	Weak aquitard; low yields in permeable lenses
A_a	Perched Zone	Vashon Drift (advance outwash-includes Esperance or Colvos Sand)	sand; mixed sand & gravel	125	300-150 asl	Some shallow domestic wells; moderate/low T

A_1		**Discovery Fm**	silt & clay	25-50	150-100 asl	Weak aquitard; often eroded
A_2	Upper Aquifer	Narrows Drift *[Possession Drift; Upper Salmon Springs Till(?); Colvos Sand]*	poorly-sorted gravel, silt, & clay	50	250-0 asl	Many domestic wells averaging 95 ft deep; no major yields
B		Kitsap Fm	brown-gray silty sand & clay	0-100	200 asl – 100 bsl	Regional aquitard although not continuous; modest yields from sand & gravel layers
C	Sea Level Aquifer	Flett Creek Drift *[Salmon Springs Drift to east; Fox Island & Double Bluff(?) Drifts]*	coarse-grained sand & gravel	250	150 asl – 150 bsl	Major source for large municipal wells; primary source near shoreline
D		Clover Park Fm *[Puyallup Fm to east]*	fine sand, silt, & clay	200	0+ asl – 300 bsl	Regional aquitard; moderate yields in sandy zones
E	Deeper Aquifer	Lakewood Drift *[Stuck Drift to east]*	poorly-sorted sand, gravel, silt, & grn clay	200	N/A	Moderate producer; few municipal wells
F		Gravelly Lake Fm *[Alderton Fm to east]*	silt & clay w/peat & wood	200	250-500 bsl	Aquitard
G	Deeper Aquifer	Lone Star Drift *[Orting Drift to east]*	sand & gravel; clay, silt & sand	100 +	450-600 bsl	Highly productive; few municipal wells

Based on elevation and lithologies, it appears that Well 8 is completed in the Sea Level Aquifer. However, the static water level elevation in Well 8, 95 ft above sea-level is more similar to adjacent wells apparently completed in the Upper Aquifer (80-200 ft asl) than those apparently completed in the Sea Level Aquifer (0-42 ft asl). It is possible that the Upper and Sea Level Aquifers are hydraulically connected in this area due to the absence or thinning of the Kitsap Formation, which normally occurs between the Upper and Sea Level Aquifers. In fact, geologic cross sections drafted for the Gig Harbor Peninsula Ground Water Management Plan show thinning of both the Upper Aquifer and Kitsap Formation in this area.

In the Gig Harbor area, both the Upper and Sea Level aquifers are recharged almost exclusively from percolating rainfall. This is because connections to other mainland aquifers are limited by topography, and stream flows are minimal. Water is lost from these aquifers either by discharge to deeper aquifers, seepage to streams or other surface water bodies, or release of ground water at the seawater interface.

Because the Kitsap Peninsula region is surrounded by Puget Sound and Hood Canal, most of the region lies within 2 miles from a shoreline and a marine water body. Therefore, sea-water intrusion resulting from ground water extraction is a potential concern for a large portion of this region. Since Well 8 appears to be completed below sea level in the Sea Level Aquifer, pumping could increase the risk of seawater intrusion to wells completed in the Sea Level Aquifer located south of the site near Carr Inlet. Pumping could also have a small effect on wells within a broader radius of the site, slightly increasing the risk of seawater intrusion. While there have been no previous reports of elevated chloride levels in the immediate vicinity, I recommend regular water quality testing to ensure that levels do not increase. I also recommend that the static water level and pumping level in the well be maintained above sea level.

Additionally, pumping could have a small effect on Wollechet Creek. Although the creek bed is located roughly 120-135 feet above the level at which pumping will occur, pumping will slightly increase the downward (vertical) gradient in the area, possibly causing leakage through the stream bed in drier months. However, it is not expected that this effect will be significant, or result in impairment.

Neighboring Water Rights

Public and private wells supply nearly the entire population of the Gig Harbor peninsula, and the locations of public water systems reflect the population distribution. The major sources of ground water supply are the Upper and Sea Level Aquifers.

The Stroh well site is over 20 acres in size and there are no immediate neighbors in the vicinity of the new well. The nearest wells that appear to be constructed into the same aquifer system are two single domestic wells situated about 1,000 feet to the south on Timber Lane NW. There are also two single domestic wells located about the same distance to the north. There are several shallower wells, completed less than 150 feet bgs, that are constructed in the general area (half mile radius).

Existing Water Rights

The Stroh Water Company holds the following water rights:

Water Right #	Well(s) Name	GPM	Qa - Primary	Qi – Supple.	Notes
G2-25126	1, 2, 3, 4	390	280		Supersedes 7257
G2-27984	Well 5	300	0	160	Supp. to G2-25126
G2-23344	Well 6	60	13.5		
G2-28042	Well 7	300	114		
G2-25484	Dr. Kuntz Wells	125	44		
Sub-total			451.5	160	
Applications					
G2-28430	*Well 5*				*Application*
G2-28125	*Proposed 8*				*Application*

Demand Forecasting

The Stroh Water Company's most recent demand projections predict they will serve 1,080 connections by the year 2010. In 1997 Stroh supplied water to 700 service connections, and used approximately 332 acre-feet per year. Based on an average water demand of 420 gallons per day per connection, Stroh Water will need to secure rights to 512.5 acre-feet per year to serve its projected 2010 population.

As the integrated system currently holds primary water rights amounting to 451.5 acre-feet per year, I recommend the allocation of an additional 61 acre-feet per year primary supply.

I recommend that the annual quantity of water pumped from this well be based on a cautious pumping schedule. Based on a withdrawal rate of 140 gpm, and an approximate 12-hour average production day, this well will produce 113 acre-feet per year, of which 61 acre-feet will be considered primary supply, and 52 acre-feet will be supplemental to existing rights.

FINDINGS AND CONCLUSION:

This well is completed in an aquifer system that generally discharges to the Puget Sound, with minimal effects to the upper aquifers. Withdrawals from this depth will not impair surface waters in the basin.

This appropriation is for a beneficial use, and will not impair existing rights or be detrimental to the public's welfare.

RECOMMENDATION:

I recommend that this application be approved and a permit be issued to allow appropriation of 140 gallons per minute from a well, and 113 acre-feet per year, 61 acre-feet primary, and 52 acre-feet supplemental to existing rights. The period of use is year-round as needed.

This permit is subject to the following provisions.

Provisions

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, 90.44.450 and WAC 508-64-020 through –040, and WAC 508-12-030. Meter readings shall be recorded at least monthly.

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data from all of the Stroh wells, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format (ASCII) and shall include the following elements:

For Water Use Reporting:

1. Measurement method (totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons

3. Unique Well ID number

For Water Level Reporting:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

For Water Quality Monitoring:

1. Unique Well ID Number
2. Sampling date and time
3. Chloride concentration (mg/L)
4. Submit paper copy of laboratory report

Permittee or certificate holder, and its successor(s) shall provide data on chloride concentrations for the well authorized by this permit or certificate with analysis performed by a state accredited laboratory. Accreditation information may be obtained from Ecology's Quality Assurance Program at (360) 895-4649. Sampling shall occur in April and August of each year, with a copy of the laboratory results for both sampling events submitted by October 15 of the same year, to the Department of Ecology, Southwest Regional Office, Olympia, Washington.

If pumping of the well authorized by this permit or certificate causes chloride concentrations to exceed 50 milligrams per liter, immediate action shall be required to prevent concentrations from increasing (such as reducing the instantaneous withdrawal rate (gpm) of the well). If corrective measures fail to prevent chloride concentrations from exceeding said level in the future, permittee or certificate holder shall relinquish the option to perfect additional allocated quantities regardless of the stage of development.

The applicant is advised that notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent distribution system has been constructed and that quantity of water allocated by the permit to the extent water is required, has been put to full beneficial use.

REPORTED BY: Jill E Walsh Date: April 7, 1999

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-28125, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 7th day of April, 1999.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office